

Green Manure Mulch and Cover Crop for Orchards

FNE 02-429

Final Report

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The project, Green Manure Mulch and Cover Crop for Orchards, grew out of a desire to provide nitrogen and other nutrients to apple trees without the use of added chemical fertilizers or animal wastes. Our goal in the project was to increase the fertility of the soil.

We have two farms located thirty-two miles apart in Central Maine. The home farm, The Apple Farm, we purchased in 1973. The farm had an orchard of mostly older trees, many great varieties but mostly trees past prime. We planted more and newer rootstocks to achieve dwarfing trees.

We grafted hundreds of trees to preserve some of the interesting varieties on the farm, varieties like Nodhead, Grey Pearmain, Spys, Winter Banana and others. We experimented with all manner of growing methods with an eye on organic production. In 1988 we added the farm across the road to ours. There we have planted ten acres of more mixed varieties for wholesale and for pick your own sales.

A few years ago we purchased Lakeside Orchards, a farm 32 miles away. This is a large operation (for us) with cold storage and about 100 acres of apple trees. Some of the orchard had not been cared for several years running as the previous owners scaled back on operations so we were able to get 9 acres certified organic as we brought them back into production. We have since added more trees for a total of 10.5 acres certified. Besides the orchard we have market gardens on both farms. About two acres on each farm is devoted to squash, pumpkins and vegetables. We also have a few acres of plum and pear trees.

We do all our own apple grading and packing as well as marketing. Our primary markets, besides our own two farm stands, are local grocery stores, schools and a local distributor. We press cider from our off grade fruit and sell it locally. This year for the first time we sold some of our fruit to the Whole Foods Markets in Boston.

Initially there was advice given on the set up of the project, the materials needed and what to look for from several people. Eric Sideman of the Maine Organic Farmers and Gardeners Association, folks from Johnny's Selected Seeds and Dr. Renae Moran, apple specialist from the University of Maine all were helpful. However, after the project was set up our farm help and myself did the rest.

An interim report was submitted on 3/14/04.

The following is a report on what we did and a summary of the results. Copies of soil samples and pictures of the plot are attached.

In the spring of 2002 the plots were laid out in grid form in a section of the organic orchard. (Chart attached). Soil samples were taken on 5/26/02 and sent to the University of Maine for testing. The three plot treatments were completed within a few days of the test taking. Some of the trees tagged orange, received commercial organic compost; equal number of trees, tagged blue, was left untreated; and the last group of trees, tagged yellow, was treated with the living mulch. The control trees, blue tagged, were not ground fertilized in any way. The grass under the trees was regularly mowed as in the rest of the orchard. Under the orange-tagged trees, the grass was mowed close to the ground and compost was applied all around the tree on the drip line; after that the trees were treated as all of the rest of the trees in the orchard. In the living mulch plot the grass was mowed close to the ground then the soil was shallow tilled using our rotovator offset to reach under the trees to the drip line. We then hand spread and raked in 100 lbs (for all the test trees) of Spring Manure Mix Legumes. For the rest of the growing season we did not mow this section.

On 5/17/04 soil samples were again taken and sent to UMaine for testing.

Results:

We were hoping to see more obvious differences between the three plots based on apple production, apple size and tree vigor but we found little difference. The first two years of the project there were so few apples (weather conditions and bringing the trees back into production) that it was not a fair test. This year the crop was good but during the busy season the apples were picked before any comparisons could be made. However, there were two positive results.

1. In the first year the living mulch grew well and fell over, covering the ground, preventing erosion and inhibiting grass growth. Mowing was not necessary. The next two seasons we noticed that the soil under the living mulch trees was lighter and less compacted.
2. The soil tests taken in 2002 and 2004 showed some differences. The organic matter in the test block was between 7.1 and 7.6 in 2002. In 2004 this level was between 9.2 and 12.0. According to the University of Maine's Testing Service recommendations optimum range for organic matter is 5-8% so it would appear that there was too much organic matter. However for apple trees the slow breakdown of this organic matter over a year or two means no other nitrogen needs to be added. On the UMaine website under "Interpreting Soil Test Results for Commercial Crops", under Nitrogen it says "because of ample rainfall in the Eastern U.S. there is not an acceptable year round soil test to predict the amount of nitrogen that will become available to plants over the course of a growing season. A soil's nitrogen supplying capacity depends on the microbial breakdown of organic matter to the ammonium and nitrate form." Increasing organic matter increases the likelihood that nitrogen will be available, given good microbial

activity. We also noticed in the living mulch plot that in 2004 there were earthworms while none were found in any plot in 2002.

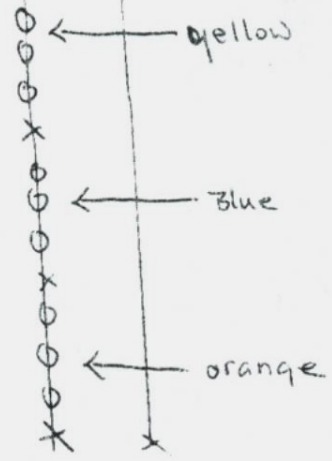
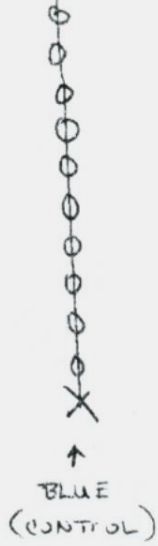
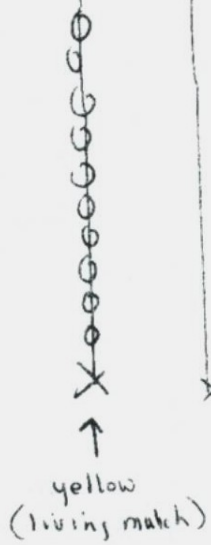
The outreach for this project was done at the January 2004 meeting of the Maine State Pomological Society in Augusta, Maine. This was a preliminary report since the project was not finished. The final results will be discussed at the Pre-Season IPM meeting to be held in March at Highmoor Farm in Monmouth Maine,

The question is would we continue with this project? We have not done so for several reasons. One is the expense. Seed was expensive and the time the project took was impossible to devote again. I think the results show that there is some benefit and in the ideal world we could find time and energy, but spreading chicken manure with a spreader is much faster for the quick fix for nitrogen at the least.

One application of living mulch seems to have had longer lasting results than one application of compost or manure so perhaps that could help justify the extra cost and time taken up by this method of fertilizing

Marilyn Meyerhans
January, 21, 2005

Fallow



Fence

FALLOW

X = CHECK TREES + ROWS

Fence

GATE

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